

WHAT IS CLAIMED IS:

1. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit and a control circuit, wherein:

said power supply unit includes a power supply which varies a power supply ability with time, switches a plurality of different power supply abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one screen and a stored power detecting circuit which detects an amount of electric power stored in said power storage unit;

said power supply is connected to said display unit via said power storage unit;

said display unit includes a matrix display area, in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, and a driving circuit including a sequence circuit for driving the matrix display area;

an input of said data input circuit is connected to a data input terminal, and an output is connected to said driving circuit of the display unit;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting a display content of said display unit and a pixel holding period for holding the display content; and

said control circuit controls said driving circuit to rewrite said display content of said display unit in response to output of a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required for at least rewriting of an image screen from said stored power detecting circuit to rewrite the screen of said display unit.

2. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data and a control circuit, wherein:

said power supply unit includes a power supply which varies a power supply ability with time, switches a plurality of different power supply abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one screen and a stored power detection circuit which detects an amount of electric

power stored in the power storage unit;

said power supply is connected to the display unit via the power storage unit;

said display unit includes a matrix display area, in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, and a driving circuit including a sequence circuit for driving the matrix display area;

said data buffer includes a frame memory for storing display data and a data accumulation detecting circuit for detecting an accumulated amount of display data, its input is connected to a data input terminal, and its output is connected to said driving circuit of said display unit;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting a display content of said display unit and a pixel holding period for holding the display content; and

said control circuit controls the driving circuit to rewrite the display content of the display unit in response to a positive logical product of a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required for at least rewriting of an image a screen from the stored power detecting circuit

and a data accumulation detection signal indicative of the accumulation of electronic data for one image screen in said data buffer.

3. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data, rewrite input means for requesting a change in the display content of said display unit and a control circuit, wherein:

said power supply unit includes a power supply which varies a power supply ability with time, switches a plurality of different power supply abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one image screen and a stored power detection circuit which detects an amount of electric power stored in said power storage unit;

said power supply is connected to the display unit via the power storage unit;

said display unit includes a matrix display area in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, and

a driving circuit including a sequence circuit for driving the matrix display area;

said data buffer includes a frame memory for storing display data and a data accumulation detecting circuit for detecting an accumulated amount of display data,

an input of the data buffer is connected to a data input terminal, and its output is connected to the driving circuit of said display unit;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting a display content of the display unit and a pixel holding period for holding the display content; and

said control circuit controls the driving circuit to rewrite said display content of said display unit in response to a positive logical product of a rewrite request signal from said rewrite input means, a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required for at least rewriting of an image screen from the stored power detecting circuit and a data accumulation detection signal indicative of the accumulation of electronic data for one image screen in the data buffer.

4. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, a data input circuit for inputting display

data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data, rewrite input means for requesting a change in the display content of the display unit and a control circuit, wherein:

said power supply unit includes a power supply which changes a power supply ability with time, switches a plurality of different power supplying abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one image screen and a stored power detecting circuit which detects an amount of electric power stored in the power storage unit;

said power supply is connected to the display unit via the power storage unit;

said display unit includes a matrix display area in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, and a driving circuit including a sequence circuit for driving the matrix display area;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting the display content of the display unit and a pixel holding period for holding the

display content; and

said control circuit controls the driving circuit so as to rewrite a still screen by rewriting a pixel display content when said stored power detecting circuit outputs a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required for at least rewriting of an image screen, and controls the driving circuit to rewrite the screen continuously in response to output of a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required to rewrite the screen continuously by said stored power detecting circuit so as to repeatedly rewrite the display content of the display unit to display a moving picture on said display unit.

5. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, rewrite input means for requesting a change in the display content of the display unit, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data and a control circuit, wherein:

said power supply unit includes a power supply which changes a power supply ability with time, switches a plurality of different power supplying abilities or has average produced power lower than

average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one screen and a stored power detecting circuit which detects an amount of electric power stored in the power storage unit;

said power supply is connected to the display unit via the power storage unit;

said display unit includes a matrix display area in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, and a driving circuit including a sequence circuit for driving the matrix display area;

said driving circuit is stopped to stop rewriting the screen of the display unit when a stored power detection signal having detected an amount of stored electric power not more than the average power required for at least rewriting of a screen of the display unit is output from the stored power detecting circuit;

said driving circuit is controlled to rewrite a still screen so to rewrite the screen by rewriting a pixel display content when a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required for at least rewriting of a screen of the display unit

is output from the stored power detecting circuit; and

said control circuit controls the driving circuit to rewrite a screen of the display unit so as to display a moving picture by rewriting the pixel display content continuously when the stored power detecting circuit detects a stored power detection signal indicative of a detected amount of stored electric power not less than the average power required to rewrite the screen continuously.

6. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, rewrite input means for requesting a change in a display content of the display unit, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data and a control circuit, wherein:

said power supply unit includes a power supply which changes a power supply ability with time, switches a plurality of different power supplying abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one image screen and a stored power detecting circuit which detects an amount of electric power stored in the power storage unit;

said power supply is connected to the display

unit via the power storage unit;

said display unit includes a matrix display area in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, and a driving circuit including a sequence circuit for driving the matrix display area;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting a display content and a pixel holding period for holding the display content;

said data buffer has a function to selectively transfer the display data corresponding to the display area and less than the input display data to the driving circuit of the display unit, and a transferred display area portion is controlled by a signal of the stored electric power amount output from the stored power detecting circuit; and

said control circuit controls the driving circuit and the data buffer to rewrite an image screen so to change a rewriting area in plural steps so that a part of display on the display area is rewritten when the amount of stored electric power detected by said stored power detecting circuit is small, a large portion is rewritten when the amount of stored electric power is large, and the entire screen is rewritten when the amount of stored electric power is large.

7. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, rewrite input means for requesting a change in a display content of the display unit, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data and a control circuit, wherein:

said power supply unit includes a power supply which changes a power supply ability with time, switches a plurality of different power supplying abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one image screen and a stored power detecting circuit which detects an amount of electric power stored in the power storage unit;

said power supply is connected to the display unit via the power storage unit;

said display unit includes a matrix display area in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, a sequence circuit for driving the matrix display area and a driving circuit having a function to convert the display data into a signal voltage;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting a display content and a pixel holding period for holding the display content;

said data buffer has a function to convert the input display data into data corresponding to a pixel density lower than the display area and to transfer to the driving circuit of the display unit;

said pixel density to be converted is controlled by a signal of the stored electric power amount of the stored power detecting circuit; and

when said stored power detecting circuit detects that an amount of stored electric power is small, the control circuit controls the driving circuit and the data buffer to rewrite an image screen with high resolutions in plural stages by displaying display data converted to have a low-density pixel structure from the data buffer with a pixel density lowered by supplying the same signal voltage to plural pixels in the display area, making a display with higher resolutions when said stored power detecting circuit detects that the amount of stored electric power is large, and making a display with the same resolutions as the pixel structure when the amount of stored electric power is large.

8. A display device comprising a power supply unit for supplying power, a display unit for displaying an image, rewrite input means for requesting a change

in a display content of the display unit, a data input circuit for inputting display data corresponding to an image to be displayed on the display unit, a data buffer for storing the input display data and a control circuit, wherein:

said power supply unit includes a power supply which changes a power supply ability with time, switches a plurality of different power supplying abilities or has average produced power lower than average power required to rewrite one screen, a power storage unit which has a capacity of stored electric power for holding power higher than the average power required to rewrite one screen and a stored power detecting circuit which detects an amount of electric power stored in the power storage unit;

said power supply is connected to the display unit via the power storage unit;

said display unit includes a matrix display area in which a large number of pixels having an optical modulating function capable of changing brightness, a reflectance, a transmittance and colors by a voltage or a current are arranged in a matrix, a sequence circuit for driving the matrix display area and a driving circuit having a function to convert the display data into a signal voltage;

said pixels have a pixel memory for holding display data and are driven according to a pixel rewrite period for rewriting a display content and a

pixel holding period for holding the display content;
said data buffer has a function to transfer
the input display data to the driving circuit of the
display unit; and

when the amount of stored electric power
detected from said stored power detecting circuit is
smaller than a prescribed amount, said control circuit
controls the driving circuit by changing an amplitude
of a signal voltage of the driving circuit to make it
smaller than when the amount of stored electric power
is larger than the prescribed amount, thereby
displaying at plural levels of brightness.

9. The display device according to Claim 1,
wherein said power supply is a solar cell.

10. The display device according to Claim 9,
wherein said solar cell is a thin-film solar cell
formed on the same substrate as the display unit is
formed.

11. The display device according to Claim 9,
wherein the solar cell is an organic thin-film solar
cell formed on the same substrate as the display unit
is formed.

12. The display device according to Claim 11,
wherein said pixel circuit built in the pixels of said
display unit and said driving circuit for driving the
display unit are thin-film transistors.